

**SECTION 32 31 00  
ORNAMENTAL FENCE**

**PART 1 - GENERAL**

**1.1 GENERAL PROVISIONS**

Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made part of this Section of the Specifications. Ornamental Fencing work is limited to removal, modification and reinstallation of existing ornamental fencing, which will be demolished to allow installation of new sewers in project area.

**1.2 DESCRIPTION**

- A. Work Included: Contractor shall provide all labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
- B. Modify, furnish and install the ornamental fence system complete at the location indicated in the Contract Drawings. Supply and fabricate additional pieces as needed for complete re-installation.

**1.3 RELATED WORK**

- A. The following items are not included in this Section and will be performed under the designated Sections:
  - 1. Section 03 30 00, CAST-IN-PLACE-CONCRETE
  - 2. Section 04 43 00, NATURAL STONE VENEER.
  - 3. Section 04 72 00, CAST STONE MASONRY.
  - 4. Section 07 92 00, JOINT SEALANT.

**1.4 SYSTEM DESCRIPTION**

The fabricator shall supply a total ornamental fence system. The system shall include all components (i.e., pickets, rails, posts, and hardware) required.

**1.5 QUALITY ASSURANCE**

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

**1.6 REFERENCE STANDARDS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):  
B18.2.2-87(R2005).....Square and Hex Nuts

C. American Society for Testing and Materials (ASTM):

A36/A36M-08.....Structural Steel  
A47-99(R2004).....Malleable Iron Castings  
A48-03(R2008).....Gray Iron Castings  
A53-07.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated  
Welded and Seamless  
A123-08.....Zinc (Hot-Dip Galvanized) Coatings on Iron and  
Steel Products  
A307-07.....Carbon Steel Bolts and Studs, 60,000 PSI  
Tensile Strength  
F436-09.....Hardened Steel Washers  
F468-06.....Nonferrous Bolts, Hex Cap Screws, and Studs for  
General Use  
F593-02(2008).....Stainless Steel Bolts, Hex Cap Screws, and  
Studs

D. American Welding Society (AWS):

D1.1-04.....Structural Welding Code Steel  
D1.3-98.....Structural Welding Code Sheet Steel

E. National Association of Architectural Metal Manufacturers (NAAMM)

AMP 500-505-1988.....Metal Finishes Manual

F. Structural Steel Painting Council (SSPC):

SP 1-05.....No. 1, Solvent Cleaning  
SP 2-05.....No. 2, Hand Tool Cleaning  
SP 3-05.....No. 3, Power Tool Cleaning

**1.7 SUBMITTAL**

A. Submit the following in accordance with Section 01 33 23, SHOP  
DRAWINGS, PRODUCT DATA, AND SAMPLES:

1. General: For each item specified in description of work or Part 2 -  
Products, provide information showing complete detail, location in  
the project, material and size of components, method of joining  
various components and assemblies, finish, and location, size and  
type of anchors. Mark items requiring field assembly for erection  
identification and furnish erection drawings and instruction.
2. Provide templates and rough-in measurements as required.
3. Provide samples of full range of colors and finishes available for  
review and approval, prior to ordering.

## **1.8 PRODUCT HANDLING AND STORAGE**

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

## **PART 2 - MATERIALS**

### **2.1 FABRICATOR**

- A. The ornamental fence system shall be modified by a fabricator that is experienced in fabrication of ornamental fence products with the concealed picket attachment system and conforming with the specifications as indicated or as approved equivalent.

### **2.2 MATERIAL IS TO MATCH EXISTING/REUSE SALVAGED FENCE MATERIALS TO PROJECT SITE, WHENEVER FEASIBLE.**

- A. Structural Steel: ASTM A36.
- B. Stainless Steel: ASTM A167, Type 302 or 304.
- C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.
- D. Cast-Iron: ASTM A48, Class 30, commercial pattern.
- E. Malleable Iron Castings: ASTM A47.
- F. Primer Paint: As specified in Section 09 91 00, PAINTING.
- G. Modular Channel Units:
  - 1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
  - 2. Form channel within turned pyramid shaped clamping ridges on each side.
  - 3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
  - 4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
- H. Grout: ASTM C1107, pourable type.

## **2.3 HARDWARE**

### **A. Rough Hardware:**

1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal is used.

### **B. Fasteners:**

1. Bolts with Nuts:
  - a. ASME B18.2.2.
  - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
  - c. ASTM F468 for nonferrous bolts.
  - d. ASTM F593 for stainless steel.
2. Screws: ASME B18.6.1.
3. Washers: ASTM F436, type to suit material and anchorage.
4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

## **2.4 FABRICATION GENERAL**

### **A. Material**

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

### **B. Size:**

1. Size and thickness of members to match existing components.

### **C. Connections**

1. Except as otherwise specified, connections may be made by welding, riveting or bolting, to match existing methods.
2. Field riveting will not be approved.
3. Holes, for bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.

7. Use stainless steel connectors for removable member's machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.

E. Workmanship

1. General:
  - a. Fabricate items to design shown.
  - b. Furnish members in longest lengths commercially available within the limits shown and specified.
  - c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
  - d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
  - e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
  - f. Prepare members for the installation and fitting of hardware.
  - g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
  - h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.
2. Welding:

- a. Weld in accordance with AWS standards as listed in article Applicable Publications.
- 3. Joining:
  - a. Miter or butt members at corners.
  - b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
- 4. Anchors:
  - a. Provide as indicated.
- 5. Cutting and Fitting:
  - a. Accurately cut, machine and fit joints, corners, copes, and miters.
  - b. Fit removable members to be easily removed.
  - c. Design and construct field connections in the most practical place for appearance and ease of installation.
  - d. Fit pieces together as required.
  - e. Fabricate connections for ease of assembly and disassembly without use of special tools.
  - f. Joints firm when assembled.
  - g. Conceal joining, fitting and welding on exposed work as far as practical.
  - h. Do not show rivets and screws prominently on the exposed face.
  - i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.
- F. Finish:
  - 1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
  - 2. Steel and Iron: NAAMM AMP 504.
    - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
    - b. Surfaces exposed in the finished work:
      - 1) Finish smooth rough surfaces and remove projections.
      - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
    - c. Shop Prime Painting:
      - 1) Surfaces of Ferrous metal:
        - a) Provide as defined in SSPC-SP2 and SP3.
      - 2) Non ferrous metals: Comply with MAAMM-500 series.

G. Protection:

1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.
2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. All new installations shall be laid out by the contractor in accordance with the construction plans.

**3.2 FENCE INSTALLATION**

- A. Fence post shall be spaced according to the manufacturer's layout tables for the fence being provided, and the brackets to be provided, plus or minus 12mm (½"). For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the fabricator. Posts shall be set in concrete footers having a minimum depth of 900mm (36"), or as indicated in the Contract Drawings, whichever is greater. (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

**3.3 FENCE INSTALLATION MAINTENANCE**

- A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed surfaces; 1) Remove all metal shavings from cut area. 2) Apply custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1& 2 above will negate warranty. Manufacturer's spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of parts or components, other than those from the fence manufacturer, will negate the manufactures' warranty.

### **3.5 CLEANING**

- A. Contractor shall clean the jobsite of excess materials; post-hole excavations shall be cleaned, and debris removed or scattered uniformly away from posts, so as to not disturb the adjoining topsoil and turf growth.

- - - END - - -